1) The exchange rate policy during the commodity boom
2) Output gap and inflation
Some evidence from Argentina

Luciano Campos
(CUNEF)

BDE seminar 2017

Insights

- LATAM countries are quite different, but they share common macroeconomic outcomes in the last decades.

Insights

- LATAM countries are quite different, but they share common macroeconomic outcomes in the last decades.
- 1930-70's: most countries develop an inward looking growth model with initial good results $\Rightarrow$ moderate growth, low volatility and moderate inflation.

Insights

- LATAM countries are quite different, but they share common macroeconomic outcomes in the last decades.
- 1930-70's: most countries develop an inward looking growth model with initial good results $\Rightarrow$ moderate growth, low volatility and moderate inflation.
- 1980's: inward looking model failed and ended up in hyperinflationary crisis.

Insights

- LATAM countries are quite different, but they share common macroeconomic outcomes in the last decades.
- 1930-70's: most countries develop an inward looking growth model with initial good results $\Rightarrow$ moderate growth, low volatility and moderate inflation.
- 1980's: inward looking model failed and ended up in hyperinflationary crisis.
- 1990's: openness/liberalization/fix ER $\Rightarrow$ low inflation and moderate growth.

Insights

- LATAM countries are quite different, but they share common macroeconomic outcomes in the last decades.
- 1930-70's: most countries develop an inward looking growth model with initial good results $\Rightarrow$ moderate growth, low volatility and moderate inflation.
- 1980's: inward looking model failed and ended up in hyperinflationary crisis.
- 1990's: openness/liberalization/fix ER $\Rightarrow$ low inflation and moderate growth.
- 1990-2000's: BOP crisis.

Insights

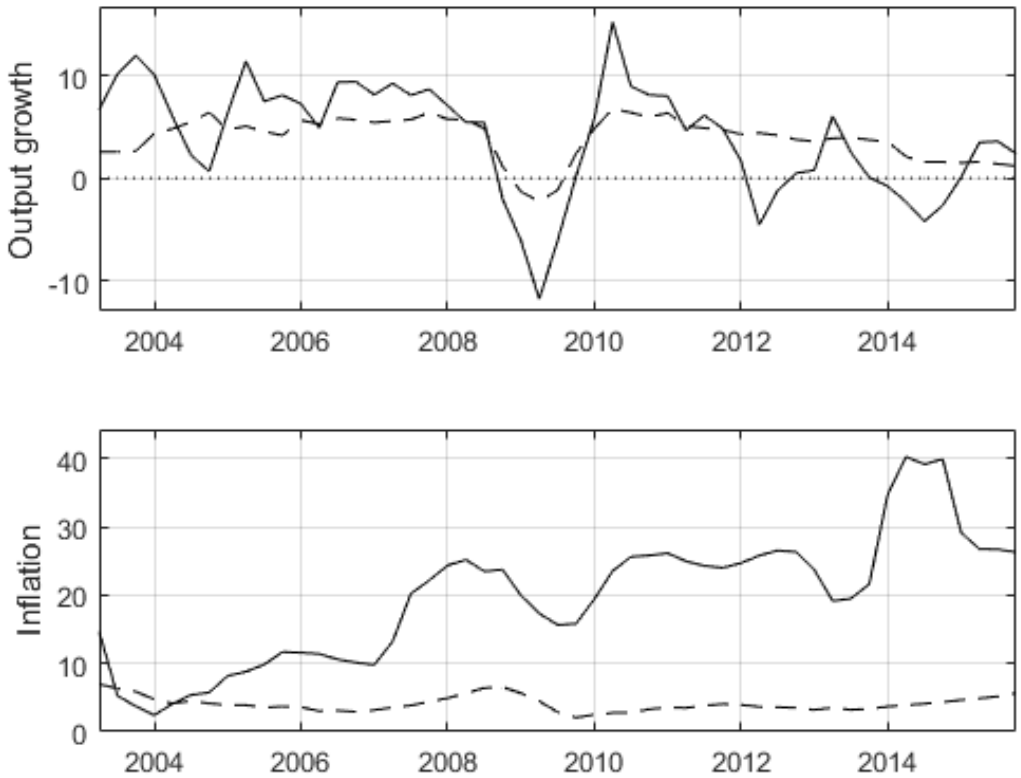
- LATAM countries are quite different, but they share common macroeconomic outcomes in the last decades.
- 1930-70's: most countries develop an inward looking growth model with initial good results $\Rightarrow$ moderate growth, low volatility and moderate inflation.
- 1980's: inward looking model failed and ended up in hyperinflationary crisis.
- 1990's: openness/liberalization/fix ER $\Rightarrow$ low inflation and moderate growth.
- 1990-2000's: BOP crisis.
- 2000's: outward looking growth models with flexible ER $\Rightarrow$ high growth, low volatility and low inflation.

Insights

- LATAM countries are quite different, but they share common macroeconomic outcomes in the last decades.
- 1930-70's: most countries develop an inward looking growth model with initial good results $\Rightarrow$ moderate growth, low volatility and moderate inflation.
- 1980's: inward looking model failed and ended up in hyperinflationary crisis.
- 1990's: openness/liberalization/fix ER $\Rightarrow$ low inflation and moderate growth.
- 1990-2000's: BOP crisis.
- 2000's: outward looking growth models with flexible ER $\Rightarrow$ high growth, low volatility and low inflation.
- However, Argentina has been an exception in the 2000's ...

Argentina vs LATAM in the 2000's

Figure: Argentina (—) and rest of LA (−−).



- Output was twice as volatile in Argentina.
- Inflation was much higher and volatile in Argentina.

This paper

- Why did Argentina performed worse?

This paper

- Why did Argentina performed worse?

  1. country-specific shocks from abroad.

  2. common shocks from abroad were transmitted differently due to the ER policy.

  3. economic policy was different.

This paper

- Why did Argentina performed worse?

  1. country-specific shocks from abroad.

  2. common shocks from abroad were transmitted differently due to the ER policy.

  3. economic policy was different.

- My articles explore 2) and 3). In particular, I study the policy responses to:

This paper

- Why did Argentina performed worse?
  1. country-specific shocks from abroad.
  2. common shocks from abroad were transmitted differently due to the ER policy.
  3. economic policy was different.
- My articles explore 2) and 3). In particular, I study the policy responses to:
- 1st paper: the 2000's commodity boom.
- 2nd paper: the output gap.

Empirical methodology

- Structural VARs are used in the estimations.

Empirical methodology

- Structural VARs are used in the estimations.
- SVARs have basically two advantages wrt other empirical methods:

Empirical methodology

- Structural VARs are used in the estimations.
- SVARs have basically two advantages wrt other empirical methods:
  1. They're less demanding in terms of prior knowledge about the true underlying model.
  2. They provide relevant information through IRFs, Acum Resp, variance decomposition ...

Empirical methodology

- Structural VARs are used in the estimations.
- SVARs have basically two advantages wrt other empirical methods:
  1. They're less demanding in terms of prior knowledge about the true underlying model.
  2. They provide relevant information through IRFs, Acum Resp, variance decomposition ...
- As any empirical methodology, SVARs need to be backed up by some theory. I use:

Empirical methodology

- Structural VARs are used in the estimations.
- SVARs have basically two advantages wrt other empirical methods:
  1. They're less demanding in terms of prior knowledge about the true underlying model.
  2. They provide relevant information through IRFs, Acum Resp, variance decomposition ...
- As any empirical methodology, SVARs need to be backed up by some theory. I use:
  - Commodity boom: NK DSGE SOE model.
  - Output gap: the standard NK closed economy model.

My findings

- The 2000's commodity boom:

My findings

- The 2000's commodity boom:
  - ER policy was more active in Argentina than in LATAM . . .

My findings

- The 2000's commodity boom:
  - ER policy was more active in Argentina than in LATAM . . .
  - this *leaning against the wind* policy was probably to accumulate reserves and/or to avoid the Dutch disease. . .

My findings

- The 2000's commodity boom:
  - ER policy was more active in Argentina than in LATAM . . .
  - this *leaning against the wind* policy was probably to accumulate reserves and/or to avoid the Dutch disease. . .
  - the results were stronger output responses at the expense of higher inflation and volatility.

My findings

- The 2000's commodity boom:
  - ER policy was more active in Argentina than in LATAM . . .
  - this *leaning against the wind* policy was probably to accumulate reserves and/or to avoid the Dutch disease. . .
  - the results were stronger output responses at the expense of higher inflation and volatility.
- The output gap:

My findings

- The 2000's commodity boom:
  - ER policy was more active in Argentina than in LATAM . . .
  - this *leaning against the wind* policy was probably to accumulate reserves and/or to avoid the Dutch disease. . .
  - the results were stronger output responses at the expense of higher inflation and volatility.
- The output gap:
  - Potential output became weak in Argentina . . .

My findings

- The 2000's commodity boom:
  - ER policy was more active in Argentina than in LATAM . . .
  - this *leaning against the wind* policy was probably to accumulate reserves and/or to avoid the Dutch disease. . .
  - the results were stronger output responses at the expense of higher inflation and volatility.
- The output gap:
  - Potential output became weak in Argentina . . .
  - but actual output kept on rising . . .

My findings

- The 2000's commodity boom:
  - ER policy was more active in Argentina than in LATAM . . .
  - this *leaning against the wind* policy was probably to accumulate reserves and/or to avoid the Dutch disease. . .
  - the results were stronger output responses at the expense of higher inflation and volatility.
- The output gap:
  - Potential output became weak in Argentina . . .
  - but actual output kept on rising . . .
  - this produced an increasing output gap . . .

My findings

- The 2000's commodity boom:
  - ER policy was more active in Argentina than in LATAM . . .
  - this *leaning against the wind* policy was probably to accumulate reserves and/or to avoid the Dutch disease. . .
  - the results were stronger output responses at the expense of higher inflation and volatility.
- The output gap:
  - Potential output became weak in Argentina . . .
  - but actual output kept on rising . . .
  - this produced an increasing output gap . . .
  - accompanied with a passive monetary policy.

Literature

- The 2000's commodity boom:

Literature

- The 2000's commodity boom:
  - Commodity prices (or TOT shocks) are important BCs drivers in developing countries (Mendoza (1995)) ...

Literature

- The 2000's commodity boom:
  - Commodity prices (or TOT shocks) are important BCs drivers in developing countries (Mendoza (1995)) ...
  - so, flexible ER should be adopted because they're better isolators (Friedman (1953), Broda (2001))...

Literature

- The 2000's commodity boom:
  - Commodity prices (or TOT shocks) are important BCs drivers in developing countries (Mendoza (1995)) ...
  - so, flexible ER should be adopted because they're better isolators (Friedman (1953), Broda (2001))...
  - however, developing countries are reluctant to float: *fear for floating* (Calvo & Reinhart (2002)); *fear for appreciation* (Levy-Yeyati et al. (2013)).

Literature

- The 2000's commodity boom:
  - Commodity prices (or TOT shocks) are important BCs drivers in developing countries (Mendoza (1995)) ...
  - so, flexible ER should be adopted because they're better isolators (Friedman (1953), Broda (2001))...
  - however, developing countries are reluctant to float: *fear for floating* (Calvo & Reinhart (2002)); *fear for appreciation* (Levy-Yeyati et al. (2013)).
  - During the 2000's boom, LATAM applied countercyclical ER policies to accumulate reserves and/or to avoid de Dutch disease (Frenkel & Rapetti (2012) and Ahumada & Cornejo (2015))

Literature

- The 2000's commodity boom:
  - Commodity prices (or TOT shocks) are important BCs drivers in developing countries (Mendoza (1995)) ...
  - so, flexible ER should be adopted because they're better isolators (Friedman (1953), Broda (2001))...
  - however, developing countries are reluctant to float: *fear for floating* (Calvo & Reinhart (2002)); *fear for appreciation* (Levy-Yeyati et al. (2013)).
  - During the 2000's boom, LATAM applied countercyclical ER policies to accumulate reserves and/or to avoid de Dutch disease (Frenkel & Rapetti (2012) and Ahumada & Cornejo (2015))
- The output gap:

Literature

- The 2000's commodity boom:
  - Commodity prices (or TOT shocks) are important BCs drivers in developing countries (Mendoza (1995)) ...
  - so, flexible ER should be adopted because they're better isolators (Friedman (1953), Broda (2001))...
  - however, developing countries are reluctant to float: *fear for floating* (Calvo & Reinhart (2002)); *fear for appreciation* (Levy-Yeyati et al. (2013)).
  - During the 2000's boom, LATAM applied countercyclical ER policies to accumulate reserves and/or to avoid de Dutch disease (Frenkel & Rapetti (2012) and Ahumada & Cornejo (2015))
- The output gap:
  - Inflation in LATAM goes from (i) prices to (ii) money to (iii) fiscal deficits to (iv) political factors (Heymann & Leijonhufvud (1995))...

Literature

- The 2000's commodity boom:
  - Commodity prices (or TOT shocks) are important BCs drivers in developing countries (Mendoza (1995)) ...
  - so, flexible ER should be adopted because they're better isolators (Friedman (1953), Broda (2001))...
  - however, developing countries are reluctant to float: *fear for floating* (Calvo & Reinhart (2002)); *fear for appreciation* (Levy-Yeyati et al. (2013)).
  - During the 2000's boom, LATAM applied countercyclical ER policies to accumulate reserves and/or to avoid de Dutch disease (Frenkel & Rapetti (2012) and Ahumada & Cornejo (2015))
- The output gap:
  - Inflation in LATAM goes from (i) prices to (ii) money to (iii) fiscal deficits to (iv) political factors (Heymann & Leijonhufvud (1995))...
  - which is documented for Argentina from 1960's to 1990's (Dabús (2000), Marcet & Nicolini (2005) and Basco et al. (2009)).

Literature

- The 2000's commodity boom:
  - Commodity prices (or TOT shocks) are important BCs drivers in developing countries (Mendoza (1995)) ...
  - so, flexible ER should be adopted because they're better isolators (Friedman (1953), Broda (2001))...
  - however, developing countries are reluctant to float: *fear for floating* (Calvo & Reinhart (2002)); *fear for appreciation* (Levy-Yeyati et al. (2013)).
  - During the 2000's boom, LATAM applied countercyclical ER policies to accumulate reserves and/or to avoid de Dutch disease (Frenkel & Rapetti (2012) and Ahumada & Cornejo (2015))
- The output gap:
  - Inflation in LATAM goes from (i) prices to (ii) money to (iii) fiscal deficits to (iv) political factors (Heymann & Leijonhufvud (1995))...
  - which is documented for Argentina from 1960's to 1990's (Dabús (2000), Marcet & Nicolini (2005) and Basco et al. (2009)).
  - As for the output gap, D'Amato & Garegnani (2009) find no trade off between output gap and inflation for 1993-2007...

Literature

- The 2000's commodity boom:
  - Commodity prices (or TOT shocks) are important BCs drivers in developing countries (Mendoza (1995)) ...
  - so, flexible ER should be adopted because they're better isolators (Friedman (1953), Broda (2001))...
  - however, developing countries are reluctant to float: *fear for floating* (Calvo & Reinhart (2002)); *fear for appreciation* (Levy-Yeyati et al. (2013)).
  - During the 2000's boom, LATAM applied countercyclical ER policies to accumulate reserves and/or to avoid de Dutch disease (Frenkel & Rapetti (2012) and Ahumada & Cornejo (2015))
- The output gap:
  - Inflation in LATAM goes from (i) prices to (ii) money to (iii) fiscal deficits to (iv) political factors (Heymann & Leijonhufvud (1995))...
  - which is documented for Argentina from 1960's to 1990's (Dabús (2000), Marcet & Nicolini (2005) and Basco et al. (2009)).
  - As for the output gap, D'Amato & Garegnani (2009) find no trade off between output gap and inflation for 1993-2007...
  - but latter studies do (Damill et al. (2015), Gerchunoff & Rapetti (2016)).

My contribution

- I have basically a case study contribution: Argentina vs LA in the 2000's. No puzzle is found:
  - Commodity boom: floating is good for isolation.
  - Output gap: there's a Phillips curve trade off.

My contribution

- I have basically a case study contribution: Argentina vs LA in the 2000's. No puzzle is found:
  - Commodity boom: floating is good for isolation.
  - Output gap: there's a Phillips curve trade off.
- There's not much done on my case studies for the period studied (2004-15). Probably because the events are quite recent:
  - VAR studies are older: Broda (2004), Lanteri (2008)...
  - Or use other empirical methodologies: Damill et al. (2015), Gerchunoff & Rapetti (2016).

My contribution

- I have basically a case study contribution: Argentina vs LA in the 2000's. No puzzle is found:
  - Commodity boom: floating is good for isolation.
  - Output gap: there's a Phillips curve trade off.
- There's not much done on my case studies for the period studied (2004-15). Probably because the events are quite recent:
  - VAR studies are older: Broda (2004), Lanteri (2008)...
  - Or use other empirical methodologies: Damill et al. (2015), Gerchunoff & Rapetti (2016).
- My results can be useful for policy recommendations.

My empirical approach

- The structural VAR(p) model:

$$B_0 y_t = B_1 y_{t-1} + B_2 y_{t-2} + ... + B_p y_{t-p} + w_t$$

My empirical approach

- The structural VAR(p) model:

$$B_0 y_t = B_1 y_{t-1} + B_2 y_{t-2} + ... + B_p y_{t-p} + w_t$$

  - Commodity boom: $y_t \equiv [\Delta cp_t \quad \Delta Y_t \quad \pi_t \quad R_t \quad \Delta e_t]'$
  - Output gap: $y_t \equiv [\Delta Y_t \quad U_t]'$

My empirical approach

- The structural VAR(p) model:

$$B_0 y_t = B_1 y_{t-1} + B_2 y_{t-2} + ... + B_p y_{t-p} + w_t$$

  - Commodity boom: $y_t \equiv [\Delta cp_t \quad \Delta Y_t \quad \pi_t \quad R_t \quad \Delta e_t]'$
  - Output gap: $y_t \equiv [\Delta Y_t \quad U_t]'$

- Selection of variables is conditional on:
  - Commodity boom: NK DSGE SOE by Lubik & Schorfheide (2007)
  - Output gap: NK model by Fischer (1977) Go

My empirical approach

- The structural VAR(p) model:

$$B_0 y_t = B_1 y_{t-1} + B_2 y_{t-2} + ... + B_p y_{t-p} + w_t$$

  - Commodity boom: $y_t \equiv [\Delta cp_t \quad \Delta Y_t \quad \pi_t \quad R_t \quad \Delta e_t]'$
  - Output gap: $y_t \equiv [\Delta Y_t \quad U_t]'$

- Selection of variables is conditional on:
  - Commodity boom: NK DSGE SOE by Lubik & Schorfheide (2007)
  - Output gap: NK model by Fischer (1977) Go

- The reduced form VAR(p) model:

$$y_t = A_1 y_{t-1} + A_2 y_{t-2} + ... + A_p y_{t-p} + u_t \qquad u_t \sim \mathcal{N}(0, \Sigma_u)$$

where $A_i = B_0^{-1} B_i, i = 1, \ldots, p$ and $u_t = B_0^{-1} w_t$.

My empirical approach

- The structural VAR(p) model:

$$B_0 y_t = B_1 y_{t-1} + B_2 y_{t-2} + ... + B_p y_{t-p} + w_t$$

  - Commodity boom: $y_t \equiv [\Delta cp_t \quad \Delta Y_t \quad \pi_t \quad R_t \quad \Delta e_t]'$
  - Output gap: $y_t \equiv [\Delta Y_t \quad U_t]'$

- Selection of variables is conditional on:
  - Commodity boom: NK DSGE SOE by Lubik & Schorfheide (2007)
  - Output gap: NK model by Fischer (1977) Go

- The reduced form VAR(p) model:

$$y_t = A_1 y_{t-1} + A_2 y_{t-2} + ... + A_p y_{t-p} + u_t \qquad u_t \sim \mathcal{N}(0, \Sigma_u)$$

  where $A_i = B_0^{-1} B_i, i = 1, \ldots, p$ and $u_t = B_0^{-1} w_t$.

- The structural shocks:

$$w_t = B_0 u_t$$

  where B_0 is the impact matrix.

The moving average (MA) representation

- The VAR(1) form:

$$\mathbf{y}_t = \mathbf{A}\mathbf{y}_{t-1} + U_t$$

where $\mathbf{A}$ is the companion matrix.

The moving average (MA) representation

- The VAR(1) form:

$$\mathbf{y}_t = \mathbf{A}\mathbf{y}_{t-1} + U_t$$

where **A** is the companion matrix.

- The MA reduced form:

$$\mathbf{y}_t = \Phi(L)u_t$$

where $\Phi_i = J\mathbf{A}^i J'$ and i is the IRF time horizon.

The moving average (MA) representation

- The VAR(1) form:

$$\mathbf{y}_t = \mathbf{A}\mathbf{y}_{t-1} + U_t$$

  where **A** is the companion matrix.

- The MA reduced form:

$$\mathbf{y}_t = \Phi(L)u_t$$

  where $\Phi_i = J\mathbf{A}^i J'$ and i is the IRF time horizon.

- The MA structural form:

$$\mathbf{y}_t = \Theta(L)w_t$$

  where $\Theta_i = \Phi_i {B_0}^{-1}$.

The identification scheme

- Commodity boom $\Rightarrow$ recursiveness approach *à la* Sims (1980):
  - The impact matrix: $B_0^{-1} = \text{Chol}(\Sigma_u)$
  - The system on impact:

$$\underbrace{\begin{bmatrix} \Delta cp_t \\ \Delta Y_t \\ \pi_t \\ R_t \\ \Delta e_t \end{bmatrix}}_{y_t} = \underbrace{\begin{bmatrix} \theta_{11} & 0 & 0 & 0 & 0 \\ \theta_{21} & \theta_{22} & 0 & 0 & 0 \\ \theta_{31} & \theta_{32} & \theta_{33} & 0 & 0 \\ \theta_{41} & \theta_{42} & \theta_{43} & \theta_{44} & 0 \\ \theta_{51} & \theta_{52} & \theta_{53} & \theta_{54} & \theta_{55} \end{bmatrix}}_{\Theta_0} \underbrace{\begin{bmatrix} w_t^1 \\ w_t^2 \\ w_t^3 \\ w_t^4 \\ w_t^5 \end{bmatrix}}_{w_t}$$

The identification scheme

- Commodity boom $\Rightarrow$ recursiveness approach *à la* Sims (1980):
  - The impact matrix: $B_0^{-1} = \text{Chol}(\Sigma_u)$
  - The system on impact:

$$\underbrace{\begin{bmatrix} \Delta cp_t \\ \Delta Y_t \\ \pi_t \\ R_t \\ \Delta e_t \end{bmatrix}}_{y_t} = \underbrace{\begin{bmatrix} \theta_{11} & 0 & 0 & 0 & 0 \\ \theta_{21} & \theta_{22} & 0 & 0 & 0 \\ \theta_{31} & \theta_{32} & \theta_{33} & 0 & 0 \\ \theta_{41} & \theta_{42} & \theta_{43} & \theta_{44} & 0 \\ \theta_{51} & \theta_{52} & \theta_{53} & \theta_{54} & \theta_{55} \end{bmatrix}}_{\Theta_0} \underbrace{\begin{bmatrix} w_t^1 \\ w_t^2 \\ w_t^3 \\ w_t^4 \\ w_t^5 \end{bmatrix}}_{w_t}$$

- Output gap $\Rightarrow$ long run restrictions *à la* Blanchard & Quah (1989):
  - The impact matrix: $B_0^{-1} = \Xi_\infty^{-1} \text{Chol}\left(\Xi_\infty \Sigma_u \Xi_\infty'\right)$
  - The long run impact matrix:

$$\underbrace{\begin{bmatrix} \Delta Y_t \\ U_t \end{bmatrix}}_{y_t} = \underbrace{\begin{bmatrix} \xi_{11} & 0 \\ \xi_{21} & \xi_{22} \end{bmatrix}}_{\Xi_\infty} \underbrace{\begin{bmatrix} w_t^s \\ w_t^d \end{bmatrix}}_{w_t}$$

The identification scheme

- Commodity boom $\Rightarrow$ recursiveness approach *à la* Sims (1980):
  - The impact matrix: $B_0^{-1} = \text{Chol}(\Sigma_u)$
  - The system on impact:

$$\underbrace{\begin{bmatrix} \Delta cp_t \\ \Delta Y_t \\ \pi_t \\ R_t \\ \Delta e_t \end{bmatrix}}_{y_t} = \underbrace{\begin{bmatrix} \theta_{11} & 0 & 0 & 0 & 0 \\ \theta_{21} & \theta_{22} & 0 & 0 & 0 \\ \theta_{31} & \theta_{32} & \theta_{33} & 0 & 0 \\ \theta_{41} & \theta_{42} & \theta_{43} & \theta_{44} & 0 \\ \theta_{51} & \theta_{52} & \theta_{53} & \theta_{54} & \theta_{55} \end{bmatrix}}_{\Theta_0} \underbrace{\begin{bmatrix} w_t^1 \\ w_t^2 \\ w_t^3 \\ w_t^4 \\ w_t^5 \end{bmatrix}}_{w_t}$$

- Output gap $\Rightarrow$ long run restrictions *à la* Blanchard & Quah (1989):
  - The impact matrix: $B_0^{-1} = \Xi_\infty^{-1} \text{Chol}\left(\Xi_\infty \Sigma_u \Xi_\infty'\right)$
  - The long run impact matrix:

$$\underbrace{\begin{bmatrix} \Delta Y_t \\ U_t \end{bmatrix}}_{y_t} = \underbrace{\begin{bmatrix} \xi_{11} & 0 \\ \xi_{21} & \xi_{22} \end{bmatrix}}_{\Xi_\infty} \underbrace{\begin{bmatrix} w_t^s \\ w_t^d \end{bmatrix}}_{w_t}$$

  - Output gap ($\tilde{y}_t$): re-run history conditional on $w_t^s = 0$ (counter-factual)
  - Potential output: $\bar{y}_t = y_t - \tilde{y}_t$

The identification scheme

- Commodity boom $\Rightarrow$ recursiveness approach *à la* Sims (1980):
  - The impact matrix: $B_0^{-1} = \text{Chol}(\Sigma_u)$
  - The system on impact:

$$\underbrace{\begin{bmatrix} \Delta cp_t \\ \Delta Y_t \\ \pi_t \\ R_t \\ \Delta e_t \end{bmatrix}}_{y_t} = \underbrace{\begin{bmatrix} \theta_{11} & 0 & 0 & 0 & 0 \\ \theta_{21} & \theta_{22} & 0 & 0 & 0 \\ \theta_{31} & \theta_{32} & \theta_{33} & 0 & 0 \\ \theta_{41} & \theta_{42} & \theta_{43} & \theta_{44} & 0 \\ \theta_{51} & \theta_{52} & \theta_{53} & \theta_{54} & \theta_{55} \end{bmatrix}}_{\Theta_0} \underbrace{\begin{bmatrix} w_t^1 \\ w_t^2 \\ w_t^3 \\ w_t^4 \\ w_t^5 \end{bmatrix}}_{w_t}$$

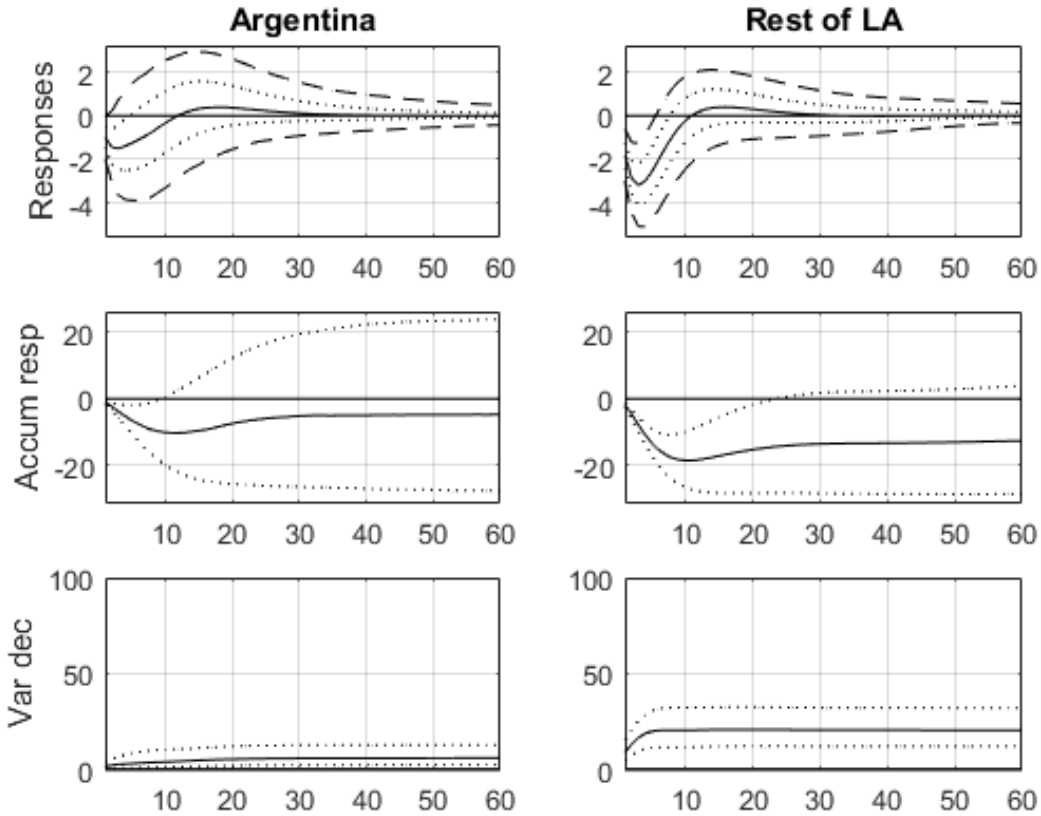
- Output gap $\Rightarrow$ long run restrictions *à la* Blanchard & Quah (1989):
  - The impact matrix: $B_0^{-1} = \Xi_\infty^{-1} \text{Chol}\left(\Xi_\infty \Sigma_u \Xi_\infty'\right)$
  - The long run impact matrix:

$$\underbrace{\begin{bmatrix} \Delta Y_t \\ U_t \end{bmatrix}}_{y_t} = \underbrace{\begin{bmatrix} \xi_{11} & 0 \\ \xi_{21} & \xi_{22} \end{bmatrix}}_{\Xi_\infty} \underbrace{\begin{bmatrix} w_t^s \\ w_t^d \end{bmatrix}}_{w_t}$$

  - Output gap ($\tilde{y}_t$): re-run history conditional on $w_t^s = 0$ (counter-factual)
  - Potential output: $\bar{y}_t = y_t - \tilde{y}_t$
- Exact identification is achieved in both systems. Go

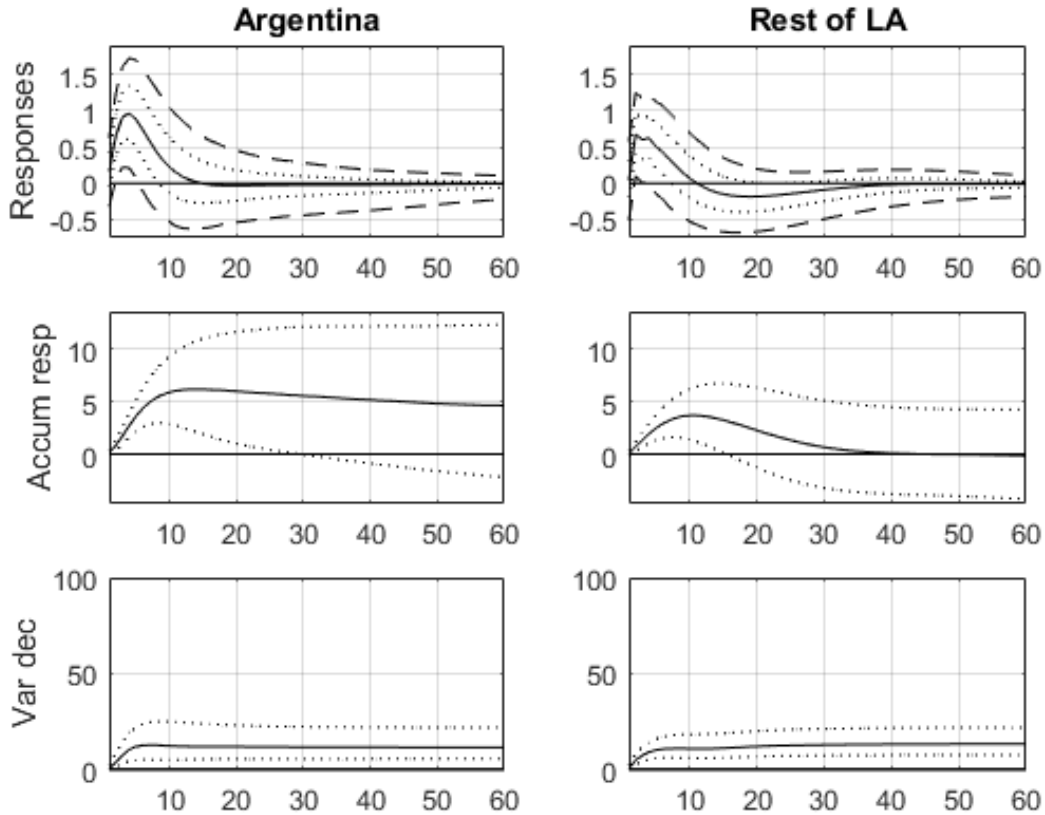
Commodity boom: evidence on exchange rate

10% Comm Pr shock: median (—), 68% ($\cdots$), 95% ($--$) CI



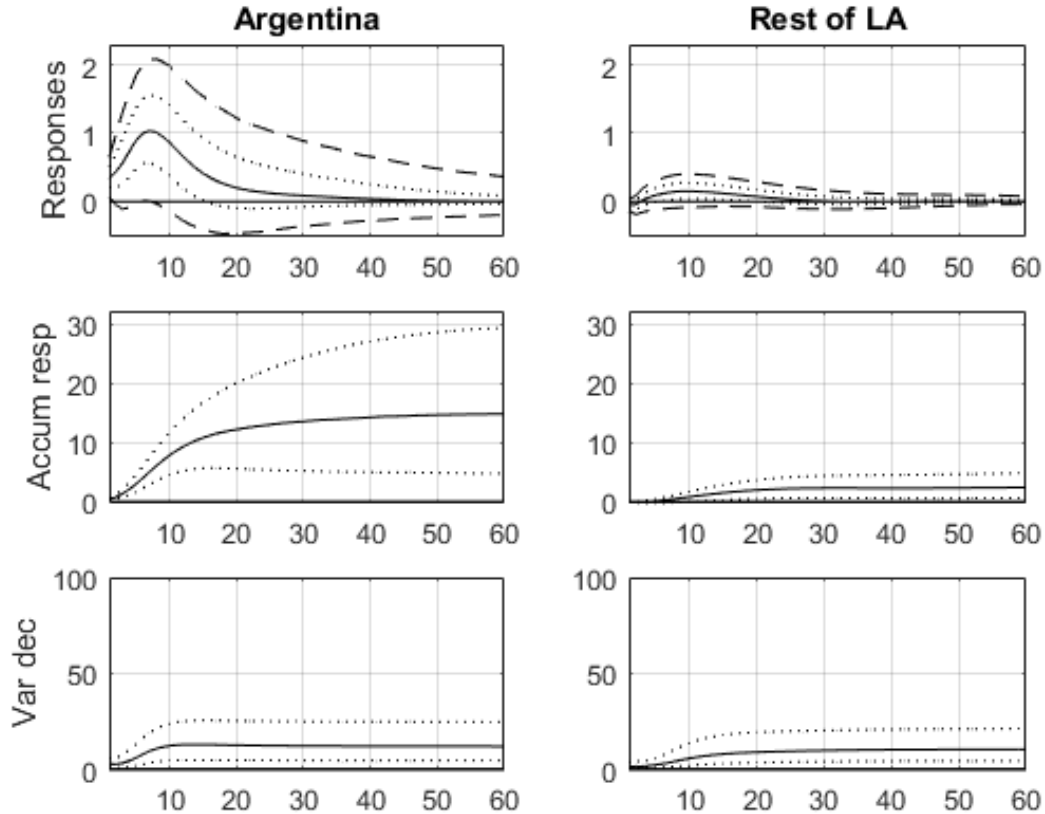
- IRF and Acc Resp: stronger appreciation in LA (average from Brazil, Chile, Colombia, Mexico and Peru).
- Var Dec: higher in LA at all horizons.
- Implication: Argentina stronger *leaning against the wind* ER policy.

Commodity boom: evidence on output



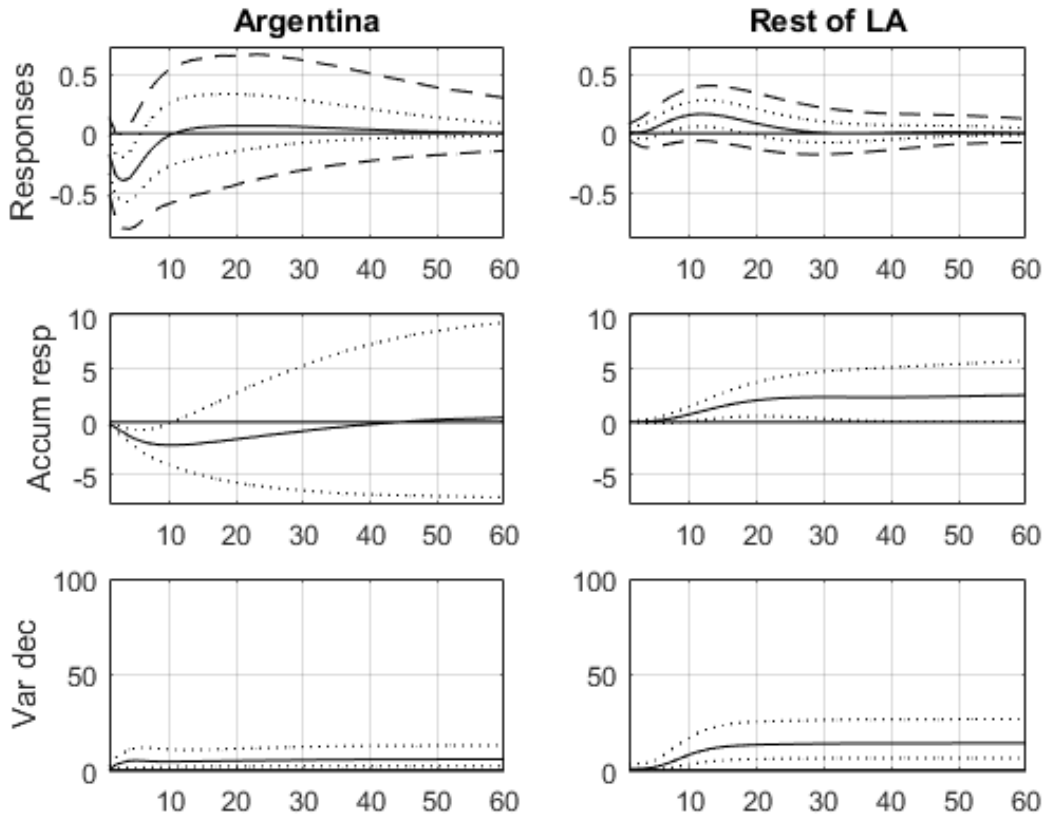
- IRF and Acc Resp: higher in Argentina.
- Var Dec: not too different.
- Implication: stronger market interventions can explain higher output volatility.

Commodity boom: evidence on inflation



- IRF and Acc Resp: higher in Argentina.
- Var Dec: not too different.
- Implication: stronger market interventions can explain higher inflation level and volatility (even with export taxes).

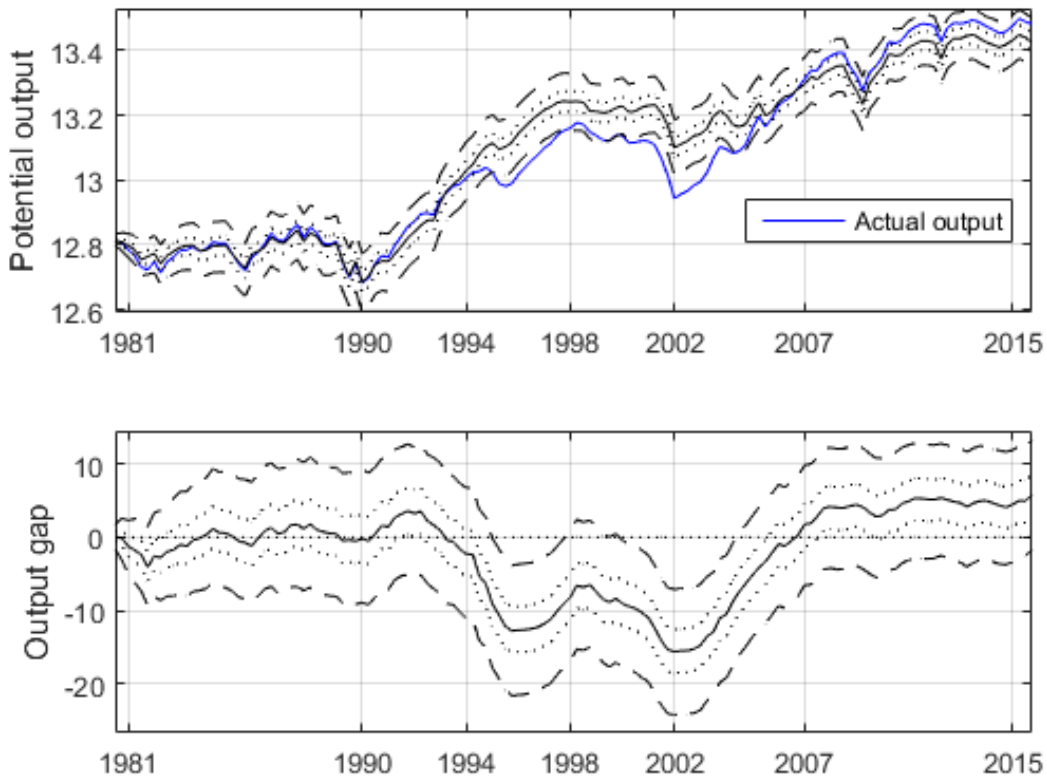
Commodity boom: evidence on interest rate



- IRF and Acc Resp: qualitative different.
- Var Dec: higher in LA.
- Implication: sterilization in LA, but in Argentina. . . ?

Output gap: evidence for Argentina (1980-2015)

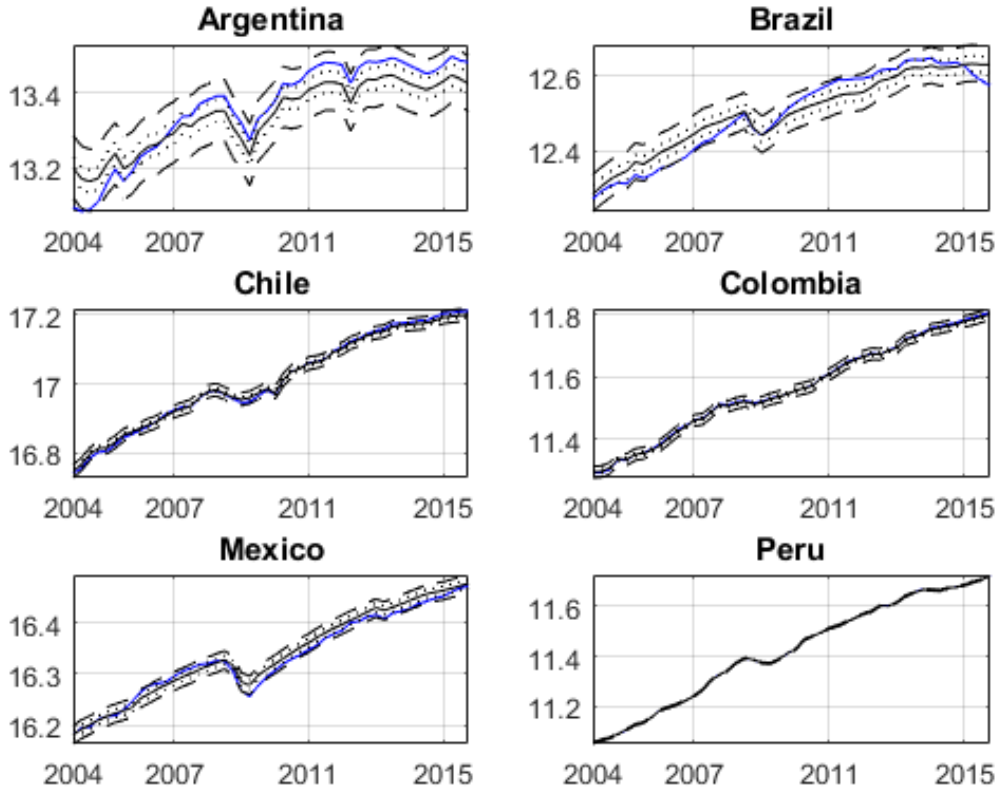
Argentinian median estimates (—), 68% ($\cdots$) and 95% ($--$) CI



Period	Potential output	Output gap	Inflation
1980's	Stagnant	0	Hyper
1990's	Increasing	Negative	Low
2002-7	Increasing	Closing	Low
2007-15	**Weak**	**Positive**	**High**

Output gap: evidence for LA (2004-15); potential output

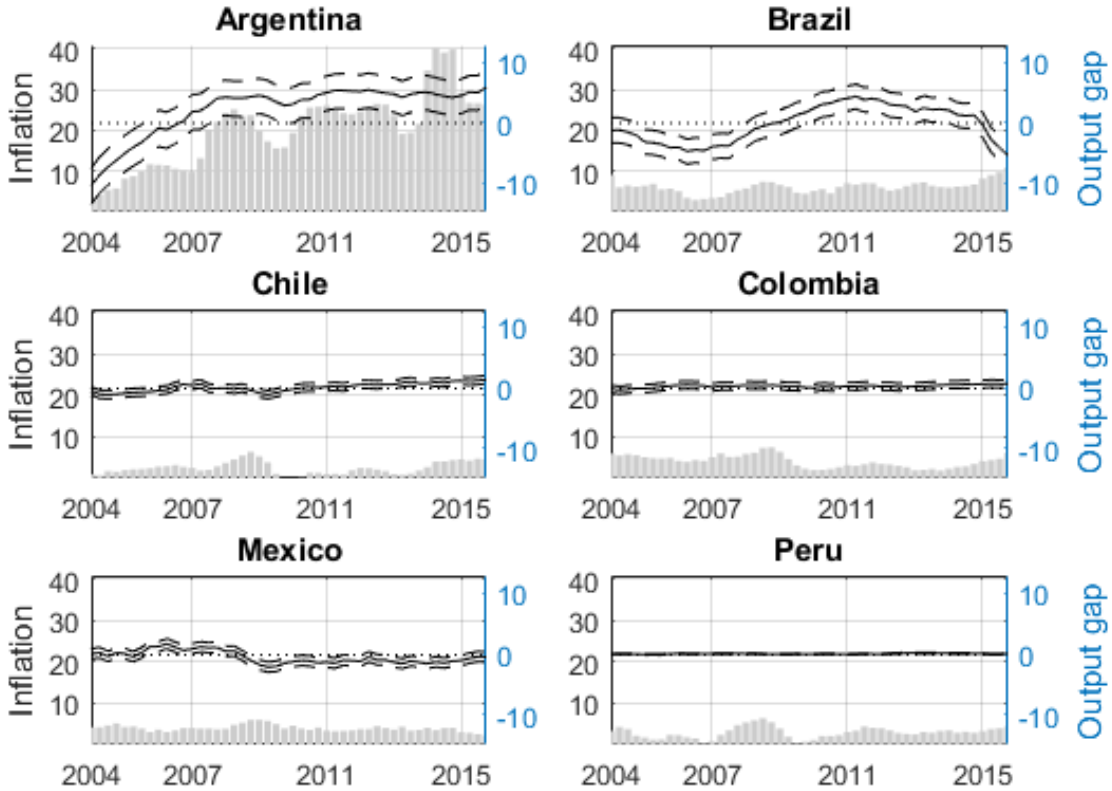
Actual output (—), potential output (—), 68% (· · ·) and 95% (– –) CI



Period	Argentina	Rest of LA
2004-8	Increasing	Increasing
2009-10	Contraction	Contraction
2011-15	**Weak**	**Increasing**

Output gap: evidence for LA (2004-15); output gap and inflation

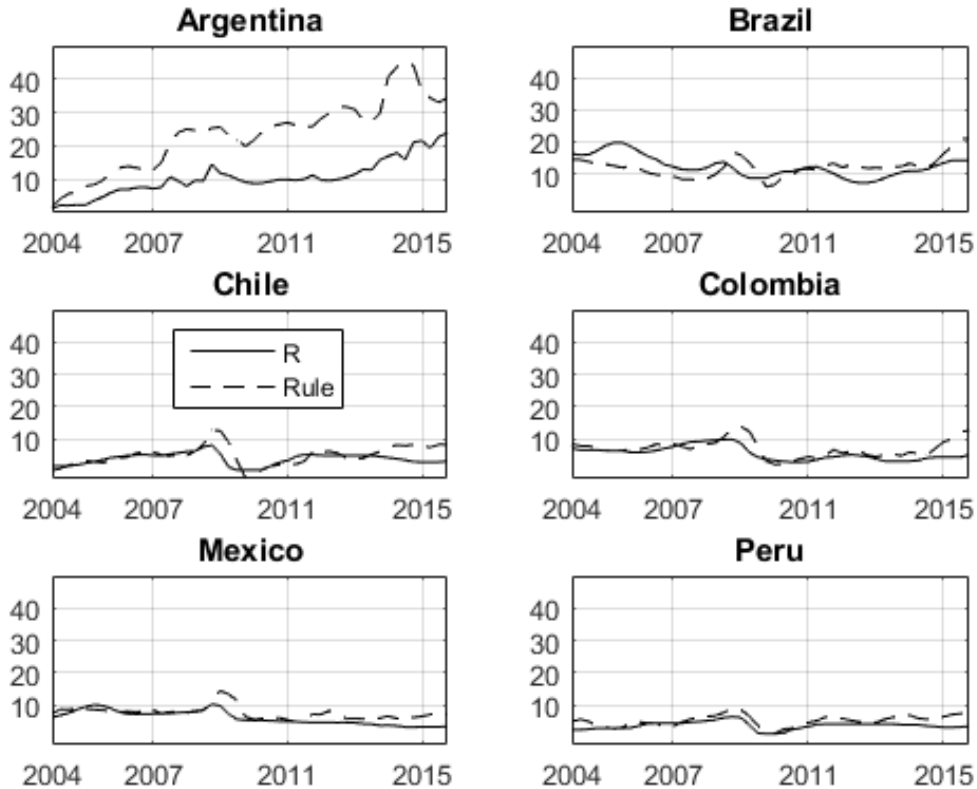
Inflation (▮), output gap (—) and 68 % CI (−−)



	Argentina	Rest of LA
Output gap	Increasing	Nonsignificant
Inflation	High	Low
Corr(OutGap,Infl)	**0.8**	$\simeq 0$

Output gap: evidence for LA (2004-15): monetary policy

- Compare actual interest rate with an *ex-post* rule. ▸ Go



	Argentina	Rest of LA
Deviation from rule	Increasing	Nonsignificant
Mean deviation (different parameter's specifications)	10% - 15%	$\simeq 0$
Mean deviation (baseline specification)	**13%**	$\simeq 0$

Conclusions and policy implications

- Argentina performed worse than LATAM from 2004 to 2015:
  - Higher output volatility.
  - Higher and more volatile inflation.

Conclusions and policy implications

- Argentina performed worse than LATAM from 2004 to 2015:
  - Higher output volatility.
  - Higher and more volatile inflation.
- According to my findings, exchange rate and monetary policy contributed to this worse performance:
  - Stronger *leaning against the wind* ER policy than in LATAM.
  - Looser monetary policy.

Conclusions and policy implications

- Argentina performed worse than LATAM from 2004 to 2015:
  - Higher output volatility.
  - Higher and more volatile inflation.
- According to my findings, exchange rate and monetary policy contributed to this worse performance:
  - Stronger *leaning against the wind* ER policy than in LATAM.
  - Looser monetary policy.
- Derived policy recommendations:
  - If subject to a commodity boom $\Rightarrow$ float more.
  - If there's an output gap $\Rightarrow$ follow a monetary rule.

Theory: commodity boom

- Model from Lubik & Schorfheide (2007) (simplified version of Galí & Monacelli (2005)):

$$\text{IS:} \quad y_t = E_t y_{t+1} - [\tau + \alpha(2-\alpha)(1-\tau)](R_t - E_t\pi_{t+1}) - \rho_z z_t$$
$$- \alpha[\tau + \alpha(2-\alpha)(1-\tau)]E_t\Delta q_{t+1} + \alpha(2-\alpha)\frac{1-\tau}{\tau}E_t\Delta y^*_{t+1}$$

$$\text{NKPC:} \quad \pi_t = \beta E_t\pi_{t+1} + \alpha\beta E_t\Delta q_{t+1} - \alpha\Delta q_t + \frac{\kappa}{\tau + \alpha(2-\alpha)(1-\tau)}(y_t - \bar{y}_t)$$

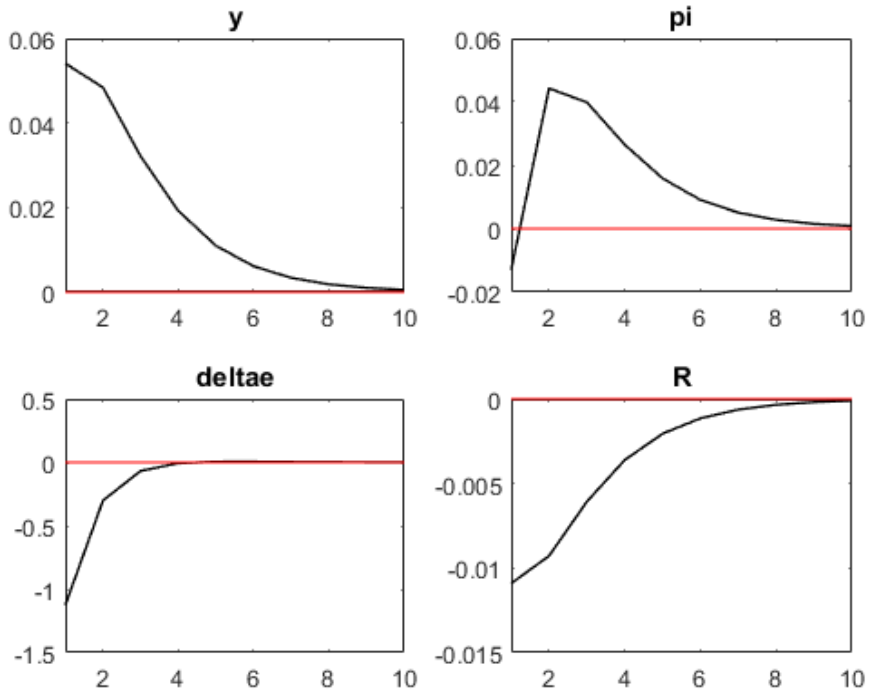
$$\text{Rule:} \quad R^*_t = \pi^* + \rho_R R_{t-1} + (1-\rho_R)[\phi_\pi(\pi_t - \pi^*) + \phi_y\tilde{y}_t + \phi_e\Delta e_t]$$

$$\text{PPP:} \quad \pi_t = \Delta e_t + (1-\alpha)\Delta q_t + \pi^*_t$$

$$\text{TOT:} \quad \Delta q_t = \rho_q\Delta q_{t-1} + \varepsilon_{q_t} \qquad ; \qquad \varepsilon_{q_t} \sim \mathcal{N}(0, \sigma^2_q)$$

- Parameters' values calibrated to benchmark posterior distribution obtained by Lubik & Schorfheide (2007) using Canadian data.

DSGE dynamics after a TOT shock



An improvement in terms of trade is followed by:

- an increase in output due to higher demand,
- a rise in prices due to output gap,
- a nominal exchange rate appreciation due to relative PPP,
- a small drop in R due to the monetary rule.

Theory: output gap

1. New Keynesian model from Fischer (1977):

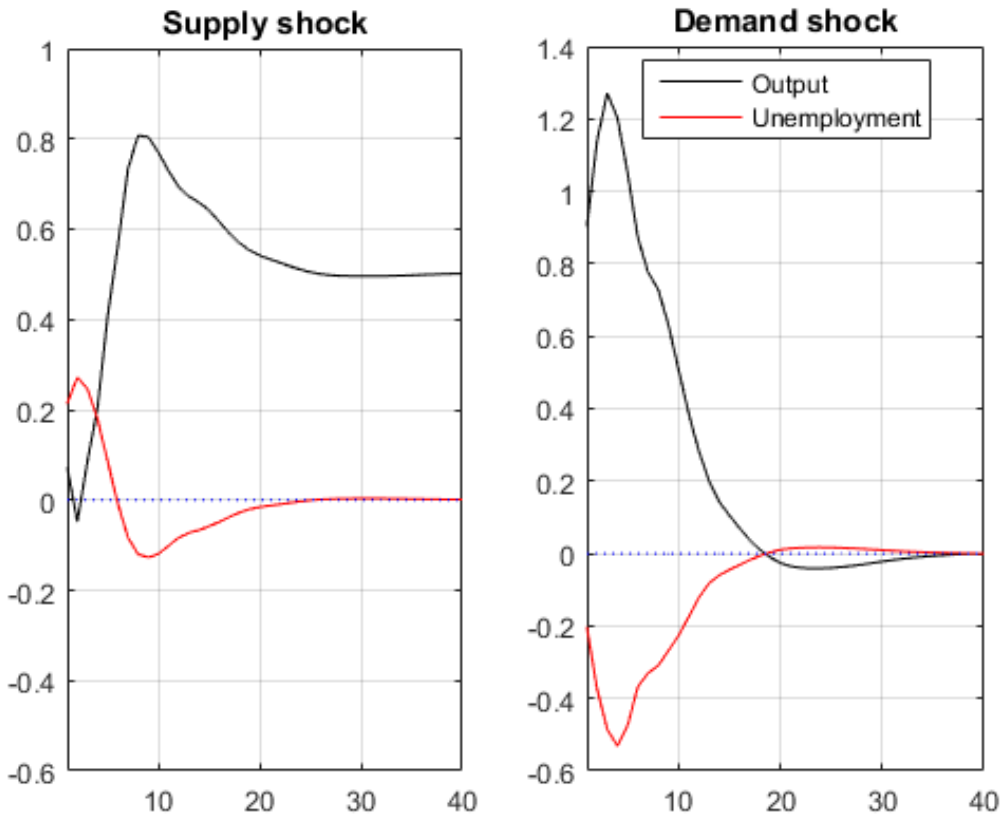
$$\begin{aligned}
\text{Demand:} \quad & Y_t = M_t - P_t + a\theta_t \qquad ; a > 0 \\
\text{Production:} \quad & Y_t = N_t + \theta_t \\
\text{Prices:} \quad & P_t = W_t - \theta_t \\
\text{Wages:} \quad & W_t = W|\{\mathcal{E}_{t-1} N_t = \bar{N}\} \\
\text{Demand shock:} \quad & M_t = M_{t-1} + w_t^d \\
\text{Supply shock:} \quad & \theta_t = \theta_{t-1} + w_t^s
\end{aligned}$$

2. Defining $U_t = \bar{N} - N_t$ and $\Delta Y_t = Y_t - Y_{t-1}$, the model has the following MA structural form:

$$\underbrace{\begin{bmatrix} \Delta Y_t \\ U_t \end{bmatrix}}_{y_t} = \underbrace{\begin{bmatrix} 1 + (1-L)a & (1-L) \\ -a & -1 \end{bmatrix}}_{\Theta(L)} \underbrace{\begin{bmatrix} w_t^s \\ w_t^d \end{bmatrix}}_{w_t} \qquad ; (w_t^s, w_t^d)' \sim \mathcal{N}(0, I_2)$$

where demand shocks have temporary effects on output and supply shocks have permanent ones.

Dynamics



- Supply shocks have permanent effects on output.
- Demand shocks have transitory effects only.

Back

Exact identification

- The variance-covariance matrix:

$$\begin{aligned} Var(u_t) &= Var(B_0^{-1} w_t) \\ \Sigma_u &= B_0^{-1} Var(w_t) B_0^{-1'} \\ &= B_0^{-1} I_K B_0^{-1'} \\ &= B_0^{-1} B_0^{-1'} \end{aligned} \tag{1}$$

  where $Var(w_t) = I_K$ by definition.

- $\Sigma_u \Rightarrow K(K-1)/2$ degrees of freedom.

- B_0^{-1} needs to have $K(K-1)/2$ restrictions for exact identification. This is achieved by:

  - Commodity boom: $\text{Chol}(\Sigma_u) = B_0^{-1}$
  - Output gap: setting $\xi_{12} = 0$ in Ξ_∞

Back

Monetary rule

- As in Orphanides (2002), I compare the actual interest rate with the one of an *ex post* rule.
- Monetary rule as in Lubik & Schorfheide (2007) (LS):

$$R_t^* = \pi^* + \rho_R R_{t-1} + (1-\rho_R)[\phi_\pi(\pi_t - \pi^*) + \phi_y \tilde{y}_t + \phi_e \Delta e_t] \quad (2)$$

where R^* is the rule's rate, R is the actual interest rate, π is the inflation rate, $\tilde{y}$ is the median estimation of the output gap and Δe is the nominal exchange rate depreciation. I set an inflation target of $\pi^* = 5$.

- The parameter's values are the benchmark priors used by LS in their Bayesian estimation of (2):

Name	Symbol	Value
Smoothing parameter	ρ_R	0.5
Inflation parameter	ϕ_π	1.5
Output parameter	ϕ_y	0.25
Exchange rate parameter	ϕ_e	0.25

- I also check for different parameter's specifications...

Back

Ahumada, H. & Cornejo, M. (2015), 'Long-run effects of commodity prices on the real exchange rate: evidence for Argentina', *Económica* **61**(Enero-Diciembre).

Basco, E., D'Amato, L. & Garegnani, M. (2009), 'Understanding the money-prices relationship under low and high inflation regimes: Argentina 1977-2006', *Journal of International Money and Finance* **28**(7), 1182–1203.

Blanchard, O. J. & Quah, D. (1989), 'The dynamic effects of aggregate demand and supply disturbances,', *American Economic Review* **79**(4), 655–673.

Broda, C. (2001), 'Coping with terms-of-trade shocks: pegs versus floats', *The American Economic Review* **91**(2), 376–380.

Broda, C. (2004), 'Terms of trade and exchange rate regimes in developing countries', *Journal of International Economics* **63**(1), 31–58.

Calvo, G. & Reinhart, C. (2002), 'Fear of floating', *The Quarterly Journal of Economics* **117**(2), 379–408.

Dabús, C. (2000), 'Inflationary regimes and relative price variability: evidence from Argentina', *Journal of Development Economics* **62**(2), 535–547.

D'Amato, L. & Garegnani, M. (2009), 'La dinámica de corto plazo de la inflación: estimando una curva de Phillips híbrida neokeynesiana para Argentina (1993-2007)', *Ensayos Económicos (BCRA)* **Julio-Septiembre**(55), 33–56.

Damill, M., Frenkel, R. & Rapetti, M. (2015), 'Macroeconomic Policy in Argentina during 2002-2013', *Comparative Economic Studies* **57**(3), 369–400.

Fischer, S. (1977), 'Long term contracts, rational expectations and the optimal money supply rule', *Journal of Political Economy* **85**(1), 191–205.

Frenkel, R. & Rapetti, M. (2012), 'External fragility or deindustrialization: What is the main threat to Latin American countries in the 2010s?', *World Economic Review* **1**, 37–57.

Friedman, M. (1953), 'The case for flexible exchange rates. Essays in positive economics.', *University of Chicago Press* pp. 157–203.

Galí, J. & Monacelli, T. (2005), 'Monetary Policy and Exchange Rate Volatility in a Small Open Economy', *Review of Economic Studies* **72**, 707–734.

Gerchunoff, P. & Rapetti, M. (2016), 'La economía Argentina y su conflicto distributivo estructural (1930-2015)', *El Trimestre Económico* **83(2)**(330), 225–272.

Heymann, D. & Leijonhufvud, A. (1995), *High Inflation*, Clarendon Press, Oxford.

Lanteri, L. (2008), 'Términos de intercambio externos y balanza comercial. Alguna evidencia para la economía argentina', *Economía mexicana. Nueva época* **18**(2), 221–248.

Levy-Yeyati, E., Sturzenegger, F. & Gluzmann, P. (2013), 'Fear of appreciation', *Journal of Development Economics* **101**, 233–247.

Lubik, T. & Schorfheide, F. (2007), 'Do central banks respond to exchange rate movements? A structural investigation', *Journal of Monetary Economics* **54**(4), 1069–1087.

Marcet, A. & Nicolini, J. (2005), 'Money and prices in models of bounded rationality in high-inflation economies', *Review of Economic Dynamics* **8**(2), 452–479.

Mendoza, E. G. (1995), 'The terms of trade, the real exchange rate, and economic fluctuations', *International Economic Review* **36**(1), 101–137.

Orphanides, A. (2002), 'Monetary policy rules and the great inflation', *American Economic Review* **92**(May 2002), 115–120.

Sims, C. (1980), 'Macroeconomics and reality', *Econometrica* **January**, 1–48.